CERTIFICATE OF MAILING BY FIRST CLASS MAIL (37 CFR 1.8) Applicant(s): Mark V. Hanson et al.			Docket No. GL-01-1
Serial No. 10/077,701	Filing Date February 14, 2002	Examiner UNKNOWN	Group Art Unit 1712

Invention: NOVEL HYDROXYARYL PHOSPHINE OXIDES, GLYCIDYL ETHERS AND EPOXY COMPOSITIONS, COMPOSITES AND LAMINATES DERIVED THEREFROM

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Mark V. Hanson et al.

U.S. Serial No. 10/077,701

Filed February 14, 2002

Attorney Docket No. GL-01-1

For: NOVEL HYDROXYARYL PHOSPHINE OXIDES, GLYCIDYL ETHERS AND EPOXY COMPOSITIONS, COMPOSITES AND LAMINATES DERIVED THEREFROM

Examiner: UNKNOWN

Group Art Unit: 1712

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. 1.56, 1.97 AND 1.98

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Sir:

Applicants submit herewith patents, publications, and other information of which they are aware, which they believe may be material, as defined in 37 C.F.R. 1.56(b), to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 C.F.R. 1.56(a). While information referred to in this Information Disclosure Statement may be material pursuant to 37 C.F.R. 1.56(b), the filing of this Information Disclosure Statement is not intended to, pursuant to 37 C.F.R. 1.97(h), constitute an admission that any patent, publication or other information referred to is, or is considered to be, material to the patentability of this invention. Pursuant to 37 C.F.R. 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information exists.

☒ (a) This information Disclosure Statement is filed within the period set forth in §1.97(b) because it accompanies the new patent application submitted herewith, is filed within three months of the filing date of a national application or within three months of the date of entry of the national stage as set forth in §1.491 in an international application. Or is believed to be filed before the mailing date of a first Office Action on the merits, whichever event occurs last. However, in the event that the first office action has been mailed, the Commissioner is authorized to charge any fees under 37 C.F.R. 1.17(p) or credit any overpayment to Account No. 50-0935.

☐ This Information Disclosure Statement is filed after the period set forth in 37 C.F.R. 1.97(b), but is believed to be filed before the mailing date of a final action under §1.3 i i, whichever occurs first.

☐ (1) The undersigned attorney certifies that each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement;

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☐ (3) This Information Disclosure Statement is accompanied by a transmittal letter in which payment of the fee set forth in §1.17(p) and required by 37 C.F.R. 1.97 (c) is authorized.

A. **Patents**

1. U.S. Patent No. 3,751,481, issued August 7, 1973, entitled "Process for the Production of Tertiary Phosphines", of *K. Weinberg*;
2. U.S. Patent No. 3,784,638, issued January 8, 1974, entitled "Preparation of Tertiatry Organo-Phosphine Oxides", of *R.F. Lambert*;
3. U.S. Patent No. 3,852,362, issued December 3, 1974, entitled "Preparation of Tertiary Organophosphine Oxides", of *R.F. Lambert*;
4. U.S. Patent No. 4,126,602, issued November 21, 1978, entitled "Aromatic Polyesters Having Improved Properties", of *G. Salee*;
5. U.S. Patent No. 4,187,259, issued February 5, 1980, entitled "Polymer Blends With Improved Hydrolytic Stability Comprising a Linear Aromatic Polyester and a Methacrylate Cross-Linked Acrylate Copolymer", of *G. Salee*;
6. U.S. Patent No. 4,211,687, issued July 8, 1980, entitled "Polymer blends With Improved Flame Retardance", of *G. Salee*;
7. U.S. Patent No. 4,221,694, issued September 9, 1980, entitled "Glass-Filled Polybutylene Terephthalate Compositions of Diminished Warpage", of *G. Salee*;
8. U.S. Patent No. 4,251,429, issued February 17, 1981, entitled "Polymer Blends With Improved Flame Retardance", of *G. Salee*;
9. U.S. Patent No. 4,256,625, issued March 17, 1981, entitled "Polyester Compositions of Enhanced Tensile Strength on Ageing", of *N.W. Dachs*;
10. U.S. Patent No. 4,284,549, issued August 18, 1981, entitled "Polymer Blends With Improved Hydrolytic Stability", of *G. Salee*;
11. U.S. Patent No. 4,345,059, issued August 17, 1982, entitled "Fire Retardant Epoxy Resins Containing 3-Hydroxyalkylphosphine Oxides", of *E.R. Fretz, Jr., et al.*;
12. U.S. Patent No. 4,444,960, issued April 24, 1984, entitled "Polymer Blends With Improved Hydrolytic Stability", of *G. Salee et al.*;
13. U.S. Patent No. 4,866,155, issued September 12, 1989, entitled "Polyester of Bis(2-(Hydroxyphenyl)-Hexa-Fluoroisopropyl)Diphenyl Ether", of *W.H. Mueller et al*;

14. U.S. Patent No. 5,376,453, issued December 27, 1994, entitled "Epoxy Resin Compounds in Admixture with Glycidyl Phosphorus Compounds and Heterocyclic Polyamides", of *W. von Gentzkow et al.*;
15. U.S. Patent No. 5,399,654, issued March 21, 1995, entitled "Method for the Productiono f Phosphorus-Containing Aromatic Polyester", of *Y.H. Ko et al.*;
16. U.S. Patent No. 5,458,978, issued October 17, 1995, entitled "Epoxy Resin Systems Containing Glycidylated Aromatic Amines, Phosphorus Epoxies and Metal Salts", of *A. Bőttcher et al.*;
17. U.S. Patent No. 5,508,462, issued April 16, 1996, entitled "Process for Making Hydroxy-Terminated Aromatic Oligomeric Phosphates", of *D.A. Bright et al.*;
18. U.S. Patent No. 5,576,357, issued November 19, 1996, entitled "One-Component Reactive Resin System Comprising a Cure-Inhibiting Glycidyl Phosphorus Compound", of *H. Bayer et al.*;
19. U.S. Patent No. 5,587,243, issued December 24, 1996, entitled "Epoxy Resin Mixtures Containing Phosphonic/Phosphinic Acid Anyhdride Adducts", of *W. von Gentzkow et al.*;
20. U.S. Patent 5,648,171, issued July 15, 1997, entitled "Epoxy Resin Mixtures Containing Phosphorus Acid/Epoxy Resin Adducts", of *W. von Gentzkow et al.*; and
21. U.S. Patent No. 6,097,100, issued August 1, 2000, entitled "Resin Sealed Semiconductor Devices and a Process for Manufacturing the Same", of *S. Eguchi et al.*

B. **Foreign Patent Documents**

1. PCT Publication No. WO 99/00451, published January 7, 1999, of The Dow Chemical Company;
2. PCT Publication No. WO 01/42253 A2, published June 14, 2001, of The Dow Chemical Company;
3. PCT Publication No. WO 01/42359 A1, published June 14, 2001, of The Dow Chemical Company;
4. EPO Publication No. 0 412 425 B1, published August 1, 1990, of Siemens Aktiengesellschaft;

5. EPO Publication No. 0 795570 A1, published September 17, 1997, of Toshiba Chemical Corporation;
6. EPO Publication 1 116 774 A2, published July 18, 2001, of Sumitomo Bakelite Company Limited;
7. Japanese Publication No. 5-57991, published August 25, 1993, of Sumitomo Chemical Co., Ltd.;
8. Japanese Publication No. 61-134395, published June 21, 1986;
9. Japanese Patent Application No. 10-364988, published July 4, 2000, of Sumitomo Bakelite Co., Ltd.
10. German Offenlegungsschrift DE 3510416 A1, published September 25, 1986, of Röhm GmbH; and
11. German Offenlegungsschrift 2254902, published May 17, 1973, of M&T Chemicals Inc.

C. **Publications**

1. "Ir Spectra of the Oxides and Sulphides of Triarylphosphines and Triarylarsines", V. Baliah et al., J. Indian Chem. Soc., Vol. 67, May 1990, pp. 430-431;
2. "Synthesis and Solid-State Structures of Substituted Arylphosphine Oxides", Craig M. Whitaker et al., J. Org. Chem. 1995, 60, 3499-3508;
3. "Derivatives of Triphenylphosphine and Triphenylphosphine Oxide", Allen E. Senear et al., J. Org. Chem. 1960, 25(10), pp. 2001-2006;
4. "Synthesis and Characterization of Epoxy-Novolac Composite-Steel Adhesives", M.B. Bump et al., Polymer Materials Science & Engineering, V83, 2000, pp. 19-20;
5. "The Mass Spectra of Some *para* Substituted Triarylphosphines and Triarylphoshpine Oxides", G. Marshall, Organic Mass Spectrometry, Vol. 16, No. 6, 1981, pp. 272-274;
6. "*N*-Phenyl-*P*,*P*,*P*-triarylphospha-λ^5-azenes, Triaarylphosphines, and Triarylphosphine Oxides. Substituent Effects on ^{15}N, ^{31}P, and ^{13}C NMR Spectra", of W-N Chou et al., J. Org. Chem. 1991, 56, pp. 2762-2769;
7. "Synthesis and Characterization of Phosphine Oxide Diol Modified Epoxy Adhesives", M.A. Hickner et al., Polymer Preprints 2000, 412), pp. 1372-1373;

8. "Synthesis and Flammability of Copoly(isophthalamide)s. II. With Pendant Phosphorus Groups", K.G. Gravalos, Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 31, 1993, pp. 1355-1364;

9. "NMR Spectral Data: A Compilation of Aromatic Proton Chemical Shifts in Mono- and Di-Substituted Benzenes", B.L. Shapiro et al., J. Phys. Chem. Ref. Data, Vol. 6, No. 3, 1977, pp. 919-991;

10. "Sn-Zn System Lead Free Solder Paste", Japan Printed Circuit Association, April 2001, pp. 1-18;

11. "Phosphorus-Containing Epoxy for Flame Retardant. I. Synthesis, Thermal, and Flame-Retardant Properties", Y-L Liu et al., Journal of Applied Polymer Science, Vol. 61, 1996, pp. 613-621;

12. "Intumescent Fire Retardant Epoxy Resins", G. Camino, Chemistry and Technology of Polymer Additives, Chapter 7, 1999, pp. 108-134;

13. "Chemical Modification of Epoxy Resins by Dialkyl (or Aryl) Phosphates: Evaluation of Fire Behavior and Thermal Stability", D. Derouet et al., Journal of Applied Polymer Science, Vol. 62, 1996, pp. 1855-1868;

14. "Syntheses, Structure, Reactivity, and Thermal Properties of New Cyclic Phosphine Oxide Epoxy Resins Cured by Diamines", M-D Shau et al., Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 34, 1996, pp. 387-396;

15. "Structure Characterization, Reactivity, and Thermal Properties of New Cyclic Phosphine Oxide Epoxy Resin Containing Tetra-Oxirane Rings", M-D Shau et al., Journal of Applied Polymer Science, Vol. 68, 1998, pp. 1397-1409;

16. "Synthesis, Characterization, and Polymerization Reactions of AB_x Triarylphospine Oxide Monomers", E. Fossum, Polymer Preprints 2000, 41(1), pp. 200-201;

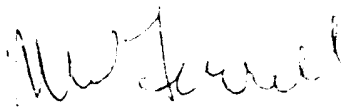
17. "Self-extinguishing Epoxy Resins without Flame Retardants: Their Potential Use in Electronics", Y. Kiuchi et al., The 12th Annual BCC Conference on Flame Retardancy, Recent Advances in Flame Retardancy of Polymeric Materials, May 21-23, 2001;

18. "Synthesis, Characterization, Thermal, and Flame Retardant Properties of Phosphate-Based Epoxy Resins", Y-L Liu et al., John Wiley & Sons, Inc., 1997, pp. 565-574;

19. "Copper-Clad Laminates for Use as Printed Circuit Boards", M. Perry et al., Plastics and Resisn Compositions, Royal Society of Chemistry, 1995, pp.74-99; and

20. "Nucleophotic Constants of Diphenyl P", Teoreticheskeye I eksperimental'naya Khimiia, v. 3(6), 1967, pp. 824-829.

Respectfully submitted,



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	Mark V. Hanson et al.	
	FILING February 14, 2002	GROUP 1712

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		U.S. Patent 3,784,638	1/8/74	R.F. Lambert	260	526S	
		U.S. Patent 3,852,362	12/3/74	R.F. Lambert	260	606.5P	
		U.S. Patent 4,126,602	11/21/78	G. Salee	260	40R	
		U.S. Patent 4,187,259	2/5/80	G. Salee	525	219	
		U.S. Patent 4,211,687	7/8/80	G. Salee	260	40R	
		U.S. Patent 4,221,694	9/9/80	G. Salee	260	40R	
		U.S. Patent 4,251,429	2/17/81	G. Salee	260	40R	
		U.S. Patent 4,256,625	3/17/81	N.W. Dachs	260	40R	
		U.S. Patent 4,284,549	8/18/81	G. Salee	260	40R	
		U.S. Patent 4,345,059	8/17/82	E.R. Fretz, Jr. et al.	528	102	
		U.S. Patent 4,444,960	4/24/84	G. Salee et al	525	534	

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
		PCT WO 99/00451	1/7/99	PCT	C08K	5/5333	✓	
		PCT WO 01/42253 A2	6/14/01	PCT	C07F	9/53	✓	
		PCT WO 01/42359 A1	6/14/02	PCT	C08L	63/00	✓	
		EPO 0 412 425 B1	2/13/91	EPO	C08G	59/40		✓
		EPO 0 795 570 A1	9/17/97	fEPO	C08G	59/40	✓	

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

		✓	"Ir Spectra of the Oxides and Sulphides of Triarylphosphines and Triarylarsines", V. Baliah et al., J. Indian Chem. Soc., Vol. 67, May 1990, pp. 430-431; "Synthesis and Solid-State Structures of Substituted Arylphosphine Oxides", Craig M. Whitaker et al., J. Org. Chem. 1995, 60, 3499-3508; "Derivatives of Triphenylphosphine and Triphenylphosphine Oxide", Allen E. Senear et al., J. Org. Chem. 1960, 25(10), pp. 2001-2006; "Synthesis and Characterization of Epoxy-Novolac Composite-Steel Adhesives", M.B. Bump et al., Polymer Materials Science & Engineering, V83, 2000, pp. 19-2;
		✓	"The Mass Spectra of Some para Substituted Triarylphosphines and Triarylphoshpine Oxides", G. Marshall, Organic Mass Spectrometry, Vol. 16, No. 6, 1981, pp. 272-274; N-Phenyl-P,P,P-triarylphospha-?5-azenes, Triaarylphosphines, and Triarylphosphine Oxides. Substituent Effects on 15N, 31P, and 13C NMR Spectra", of W-N Chou et al., J. Org. Chem. 1991, 56, pp. 2762-2769; "Synthesis and Characterization of Phosphine Oxide Diol Modified Epoxy Adhesives", M.A. Hickner et al., Polymer Preprints 2000, 412), pp. 1372-1373;

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		U.S. Patent 4,866,155	9/12/89	W.H. Mueller et al.	528	191	
		U.S. Patent 5,376,453	12/27/94	W. von Kentzkow et al.	528	415	
		U.S. Patent 5,399,654	3/21/95	Y.H. Ko et al.	528	99	
		U.S. Patent 5,458,978	10/17/95	A. Bottcher et al.	428	413	
		U.S. Patent 5,508,462	4/16/96	D.A. Bright et al.	558	99	
		U.S. Patent 5,576,357	11/19/96	H. Bayer et al.	522	170	
		U.S. Patent 5,587,243	12/24/96	W. von Gentzkow et al.	428	413	
		U.S. Patent 5,648,171	7/15/97	W. von Gentzkow et al.	428	413	
		U.S. Patent 6,097,100	8/1/00	S. Eguchi et al.	257	787	
		U.S. Patent 3,751,481	8/7/73	K. Weinberg et al.	260	601.5P	

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		Jap. Pub. 5-57991	8/25/93	Japan	C07F	9/53	✓	
		Jap. Pub. 61-134395	6/21/86	Japan	C07F	9/50		✓
		Jap. Pub. 2000-186186	7/4/00	Japan	C08L	63/00	✓	
		Ger. Off. DE 3510416 A1	9/25/86	Germany	C07F	9/53		✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

			"Synthesis and Flammability of Copoly(isophthalamide)s. II. With Pendant Phosphorus Groups", K.G. Gravalos, Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 31, 1993, pp. 1355-1364; "NMR Spectral Data: A Compilation of Aromatic Proton Chemical Shifts in Mono- and Di-Substituted Benzenes", B.L. Shapiro et al., J. Phys. Chem. Ref. Data, Vol. 6, No. 3, 1977, pp. 919-991; "Sn-Zn System Lead Free Solder Paste", Japan Printed Circuit Association, April 2001, pp. 1-18;
			"Phosphorus-Containing Epoxy for Flame Retardant. I. Synthesis, Thermal, and Flame-Retardant Properties", Y-L. Liu et al., Journal of Applied Polymer Science, Vol. 61, 1996, pp. 613-621; "Intumescent Fire Retardant Epoxy Resins", G. Camino, Chemistry and Technology of Polymer Additives, Chapter 7, 1999, pp. 108-134; "Chemical Modification of Epoxy Resins by Dialkyl (or Aryl) Phosphates: Evaluation of Fire Behavior and Thermal Stability", D. Derouet et al., Journal of Applied Polymer Science, Vol. 62, 1996, pp. 1855-1868;

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OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

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			"Synthesis, Characterization, and Polymerization Reactions of Abx Triarylphospine Oxide Monomers", E. Fossum, Polymer Preprints 2000, 41(1), pp. 200-201; "Self-extinguishing Epoxy Resins without Flame Retardants: Their Potential Use in Electronics", Y. Kiuchi et al., The 12th Annual BCC Conference on Flame Retardancy, Recent Advances in Flame Retardancy of Polymeric Materials, May 21-23, 2001; "Synthesis, Characterization, Thermal, and Flame Retardant Properties of Phosphate-Based Epoxy Resins", Y-L Liu et al., John Wiley & Sons, Inc., 1997, pp. 565-574;

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			"Copper-Clad Laminates for Use as Printed Circuit Boards", M. Perry et al., Plastics and Resisn Compositions, Royal Society of Chemistry, 1995, pp.74-9; "Nucleophotic Constants of Diphenyl P", Teoreticheskeye I eksperimental'naya Khimiia, v. 3(6), 1967, pp. 824-829

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